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SOME NEW RECORDS OF CRUSTACEA FROM KASHMIR

THE available literature on the hydrobiology of Indian Waters pertains mostly to the plains; the highland waters of Kashmir (over 5000 ft. a.s.l.) have received very little attention. Only a few studies¹⁻⁵ regarding the planktonic forms of lakes and stray ponds have been made and these too are, by and large, of a preliminary nature. There seem to be no reports of similar studies on springs, some of which form chief sources of potable water and are of great tourist attraction. A series of studies has been undertaken to investigate the hydrobiology of the various water bodies of Kashmir of which the present contribution forms a part.

During the limnological studies of Beehama spring, 24 km to the North-East of Srinagar, the following plankters were collected :

ROTIFERA

1. *Trichotria tetractis* Ehrenberg.
2. *Euchlanis dilatata* Ehrenberg.

CRUSTACEA

Cladocera

3. *Simocephalus elizabethae* King.
4. *Pleuroxus similis* Vaura.
5. *Chydorus sphaericus* O. F. Muller
6. *Alonella exigua* Lilljeborg.

Copepoda

7. *Macrocylops albidus* Jurine.
8. *Eucyclops speratus* Lilljeborg.
9. *Bryocamptus* sp.

Although all the nine species are first reports from the springs of Kashmir, the following two Cladoceran species and one Copepod species are being recorded for the first time from this part of the country.

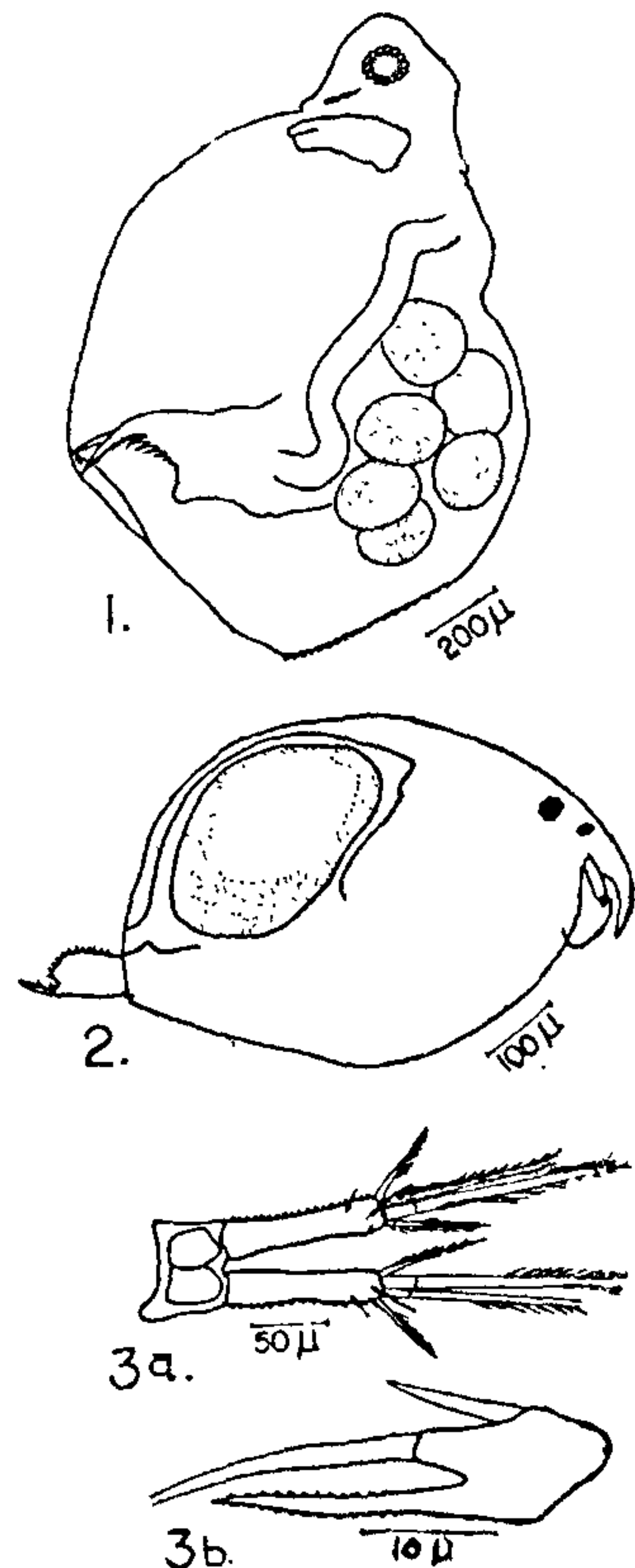
CRUSTACEA

Cladocera

Family : Daphnidae

Simocephalus elizabethae King. (Fig. 1).

A thick shell covers the large heavy body. Valves are large, somewhat quadrate, with rounded angles.



FIGS. 1-3. Fig. 1. *Simocephalus Elizabethae*, female. Fig. 2. *Pleuroxus similis*, female. Fig. 3. (a) *Eucyclops speratus*, caudal ramus, female, (b) *E. speratus*, leg 5th, female.

Small denticles are present along the postero-dorsal margin of the shell, increasing in size regularly toward the posterior extremity. A few spinules are present in the middle of the ventral

margin of the valves. The head and rostrum are small and ocellus is elongated. The abdominal processes are placed far apart. Postabdomen is large, broad, truncate, posterior and emarginate and bears eight anal spines, which decrease in size toward the anal opening. Length of the adult female is 2.0 to 2.5 mm. Only a few specimens of this species were found in the samples from the spring.

Family : Chydoridae.

Pleuroxus similis Vaura. (Fig. 2)

The surface of the bivalved shell is faintly reticulated and its anterior part is sculptured by ten to twelve curved striae. Two small infero-posteal denticles are present on the shell. The head is comparatively small. Ocellus is smaller than the eye and is nearer to it than to the tip of the rostrum. The lower edge of the labrum is without any notch. Abdominal claws are of moderate size having two basal denticles. Marginal denticles are 12 to 13 in number. The adult female measures 0.5 to 0.55 mm. in length. This species was fairly present in the spring.

Copepoda

Family : Cyclopoidae

Eucyclops speratus Lilljeborg. (Fig. 3 a, b).

Body is slender. The antenna consists of twelve segments, last three segments being very long and slender. The swimming legs are stout. Fifth leg consists of one distinct broad segment armed with an inner spine and two outer setae. Outer margin of the caudal ramus is provided with a longitudinal row of minute spinules. The inner terminal seta of the ramus is shorter than the ramus itself. Second and third setae are very long. Length of the adult female is 1.0 to 1.5 mm. This species was very common in the spring.

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EFFECT OF 'MORINDIN' A GLYCOSIDE ON THE ISOLATED HEART OF COCKROACH

GLYCOSIDES possess high physiological activity and are abundant in nature among various plants. Most of the glycosides like digoxin and digitoxin (cardiac glycosides) have therapeutic value. Glycosides from *Nerium oleander*¹ are known to possess anticancer properties and are used for heart malfunctions. As our knowledge on the effect of glycosides on insects, particularly on the heart, is fragmentary the present study has been undertaken.

The genus *Morinda* (Rubiaceae) is economically important in that the various parts of the plant are used in dyeing textiles and in medicine². The glycoside "Morindin" (6-Primeveroside of Morindone, $C_{26}H_{28}O_{14}$) has been extracted and purified from the root bark of *M. tinetaria* var. *tomentosa* Hook. f. (Rao and Reddy)³. The isolated cockroach heart technique described by Krijgsman *et al.*⁴ and Naidu⁵ was adopted in the present studies. Test solutions were prepared by dissolving 'Morindin' in acetone (wt/vol). Nicotine (NIC), atropine (ATR) and eserine (ESR) dissolved in distilled water were used along with Morindin to study its site and mode of action. A constant dosage of 1 ml/1,000 ml physiological saline⁶ was maintained. Acetone at the dilution employed was found to be ineffective on the heart. Each experiment was repeated at least five times and the average was taken to draw the graph. Each point in the figure represents the number of beats observed per minute. Arrows indicate the points of addition of the test solutions.

Morindin was found to have high stimulative effect on the heart beat frequency which was sustained for a long time (Fig. 1). Atropine (a cholinergic blocker) has inhibited its action causing a sudden decline in the frequency and amplitude. Eserine (anticholinesterase) on the other hand brings about a sudden increase in the heart beat frequency (Fig. 1). This clearly indicates that acetylcholine is involved in the action morindin.

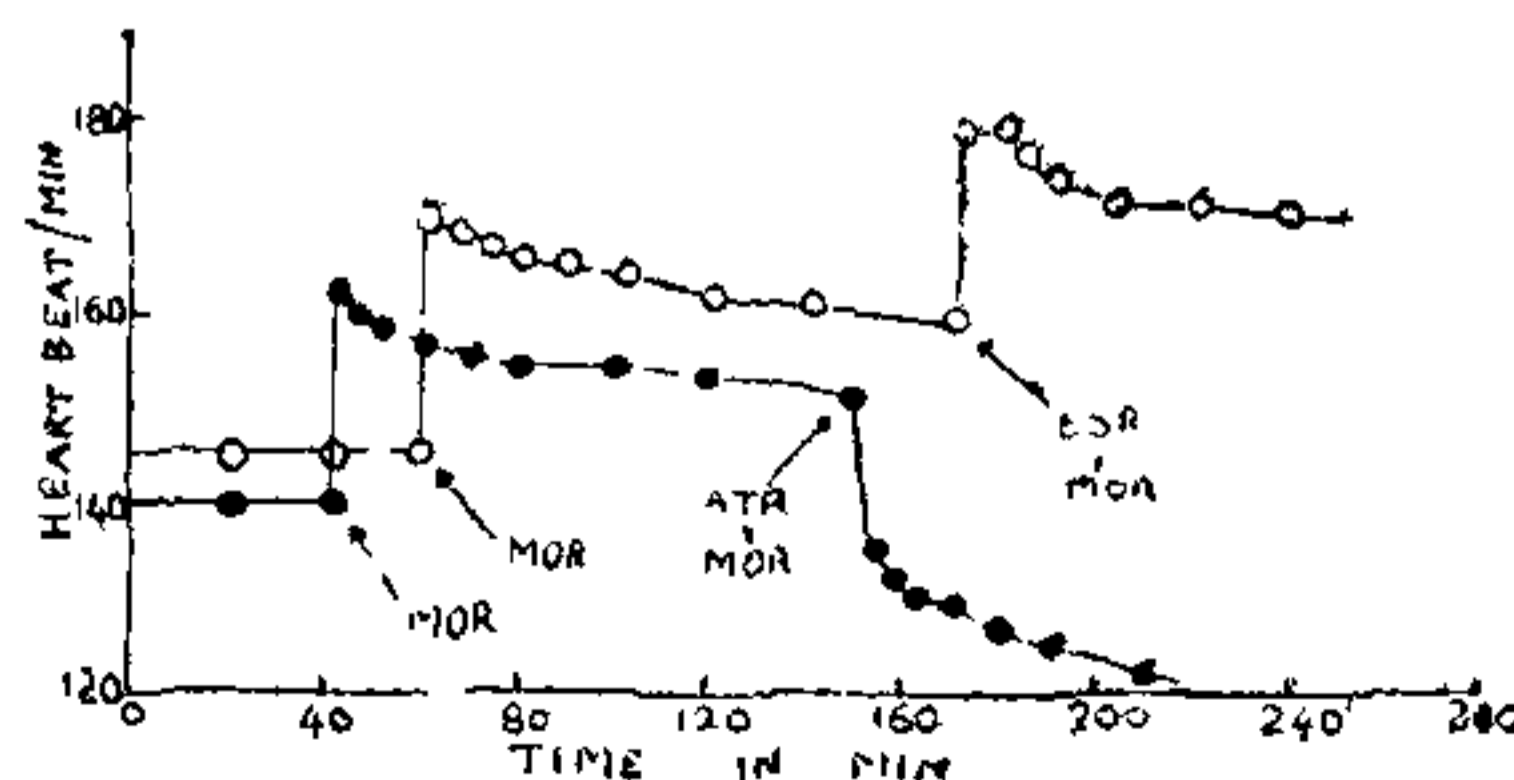


FIG. 1. Effect of morindin (5×10^{-6}), atropine (3×10^{-6}) and eserine (3×10^{-6}) on isolated cockroach heart.